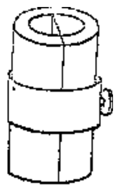
the alkali,, *i.e.* the electric current tended to pass through the vessels in the direction of the arrow,, being the reverse direction of that which the acid in A would have produced alone: but the effect instantly ceased, and the action of the plates in the vessels was so equal, that, being contrary because of the contrary position of the plates, no permanent current resulted.

671. Occasionally a zinc plate was substituted for the plate P P, and platina plates for the plates Z Z; but this caused no difference in the results: nor did a further change of the middle plate to copper produce any alteration.

672. As the opposition of electro-motive pairs of plates produces results other than those due to the mere difference of their independent actions (747, 781), I devised another form of apparatus, in which the action of acid and alkali might be



2 F

Fig. 40. Fig. 41. Fig. 42.

more directly compared. A cylindrical glass cup, about two inches deep within, an inch in internal diameter, and at least a quarter of an inch in thickness, was cut down the middle into • halves, fig. 41. A broad brass ring, larger in diameter than the cup, was supplied with a screw at one side; so that when the two halves of the cup were within the ring, and the screw was made to press tightly against the glass, the cup held any fluid put into it. Bibulous paper of different degrees of permeability was then cut into pieces of such a size as to be easily introduced between the loosened halves of the cup, and served when the latter were tightened again to form a porous division down the middle of the cup, sufficient to keep any two fluids on opposite sides of the paper from mingling, except very slowly, and yet allowing them to act freely as one *electrolyte.*

The two spaces thus produced I will call the cells A and B, fig. *42.* This instrument I have found of most general application in the investigation of the relation of fluids and metals amongst themselves and to each other. By

combining its use